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## NICK DYER-WITHEFORDS CYBER-PROLETARIAT. ACCUMULATION OF CAPITAL, CYBERNETICS AND PROLETARIAN CLASS.

ECONOFICTION CAPITAL, CLASS COMPOSITION, CLASS STRUGGLE, CYBERNETICS, IMPERIALISM, LOGISTICS, MARX, MARXISM, VORTEX

### Cybernetics and Class

Why speak of a global proletariat in the context of cybernetic capital? The term "cybernetics" has two meanings. The first is the school of thought that developed its theories for the British and American military in the 1930s through experiments in radar technology, ballistics and the construction of nuclear weapons. Secondly, he will talk about the development of computer systems. In cybernetics, machines are no longer understood as thermal power machines that generate energy through the consumption of fuel, but as entities that are regulated by the control of information. The concept of the feedback loop, which allows the machine to measure and correct the effects of its own activities on the environment, is crucial for this. Furthermore, within the framework of cybernetics, the concept of information is transformed, which generally no longer refers to knowledge but to activity. According to Rosh Ashby, even the pattern-complementing brain is not a thinking machine, but an actively computing machine that processes information. MANIAC may not have been the first computer, but he was the first computer to make use of the Random Access Memory, which contains both data and instructions, and thus makes the distinction between numbers that mean things and numbers that make things obsolete. Finally, cybernetics split into two separate and at the same time interrelated domains – automation and networks. Automation includes robots and other autonomous technologies and Artificial Intelligence (Wiener, von Neumann). In network theory, Claude Shannon's book *A Mathematical Theory of Communication*, published in 1949, was decisive, in which information was defined in purely quantitative terms. (Dyer-Witheford 2015: Section 3; Kindle Edition)

Dyer-Witheford agrees with the author collective Tiqqun that the behavior of humans and machines in the cybernetic hypothesis is controlled by machine-programmed and reprogrammed feedback loops, and in the final analysis this implies a political hypothesis, although the cybernetic reference to control and governance contains too narrow a concept to comprehensively guarantee the informatic regulation of biological, economic and technical entities. It is therefore a question of who or what governs the processes of production, circulation and financialization in the age of intelligent machines. And Dyer-Witheford's

answer to this is correctly: capital.

So the term "cybernetics" implies the meaning of command and control and this makes it useful for the analysis of capital in terms of both technology and class. Usually, the Marxist definition of class refers to the division of the members of an economy according to their position on the means of production and in the relations of production: A distinction is made between capitalists, intermediate fluid strata or middle classes and the proletariat. The stratum of the capitalists dominates all other classes. However, in sociology today, right up to the left-academic strata, the concept of the class is rejected, relativized or even replaced by the categories of gender and race, or it is claimed, for example, that we all belong to the middle class. The concept of the class is thus fundamentally criticized as reductionist, whereas Nick Dyer-Whiteford in his paper *Cyber-Proletariat* insists on the validity of Marxist class theory, inasmuch as for him the economic system, inseparably linked to civil war, continues to impose the abovementioned abstract reductions and distributions on the classes, adding that currently in most parts of the world the class struggle is conducted almost exclusively from above or by the capitalists. (Ibid.: Section 1) The ideology that the socio-economy cannot be characterized by class relations but by a series of individual projects is essential for the capitalist class and its representatives (also at the universities), indeed it is even one of its weapons in the class struggle. For Dyer-Whiteford it is also clear that class relations today have shifted in comparison to Marx's times, but they have by no means disappeared, but have only become much more complex and have strengthened their economic and political impact on a global scale. The class has become more real, extended, differentiated, branched and interwoven – precisely because the brutal binary algorithm between classes continues to exist. (Ibid.) What could be more visible, explains Dyer-Whiteford, than the difference between the living conditions of a banker being with his Superyacht and those of the immigrant who wanders the world without papers, between the Facebook billionaire and the worker in a fast food chain where he works for a miserable wage.

Referring to a famous Marx quote ("Capital is deceased labor that lives only vampirically by sucking in living labor and the more it sucks in, the more it lives"). MEW 23: 247) Dyer-Whiteford writes that the class relationship is a vampire relationship based on the transfer of energy, consciousness and time from one section of the species to another by extracting added value. Digitalization has only aggravated those class-relevant processes of industrial capital that are characterized by rationalization, redundancy and standardization. Feminist authors have analyzed these processes in their further complexification, insofar as the integration of women into digitized work processes on the one hand dissolves patriarchal patterns, but on the other hand women are mostly employed at lower wages than those of male colleagues.

With his approach to cybernetic capital, Dyer-Whiteford constantly addresses the differences in post-operationist theory currents. Authors such as Panzieri and Alquati pointed out early on that computerized automation serves to control a new generation of informational workers who would be pulverized as a political class in a multitude of micro-decisions, with capital reproducing itself only more smoothly through digital technologies, while Negri/Hardt still maintain that with the multitude that emphasizes the progressive communicative and a number of libertarian affective dimensions of network production in immaterial labor, a new revolutionary movement is emerging from below. At the latest after the financial crisis of 2008, however, it became clear that especially young, immaterial workers did not find themselves on the streets in digitalized work processes, but in masses without jobs and without social perspectives. Even various network communities were still affected by the austerity policies of austerity, and the concept of immaterial labor appeared only as a reflex of the dot.com boom, which had collapsed much earlier. The "General Intellect", often affirmatively quoted by post-operaist authors such as Negri/Hardt, is still being automated today, with journalists being replaced by new aggregators, translators by translation machines, lawyers by machines searching for precedents, photographers by photo bots, and brokers by swarming artificial intelligences. An interpretation of the General Intellect based on this can no longer invoke the emphasis of immaterial labor, but takes note of the explosive proletarianization and reproletarianization of a large part of the world's population, whereby the ever-increasing surplus population is no longer even needed by capital today for the shabbiest production processes.

#### The Concept of the Proletariat

Marxists often use the concept of the proletariat synonymously with the concept of the working class, whose members, according to Marx, are free in two senses – free from ownership of the means of production and free to sell or rent their labor for a wage, and consequently they are completely deprived of decisive and effective control over the production process (the means of production and labor), also as regards its allocative and operational conditions, whereby the workers are related to other persons as well as separated by market relations. It is precisely these conditions that make the working class or the proletariat in Marxism a revolutionary force. The English collective "Endnotes" has now again pointed out that Marx spoke of the proletarian as a wage worker who produces and valorizes capital, but who can always also be thrown onto the street if he becomes superfluous for the production of surplus value. This means that, for the proletarian, the wage labour relationship does not necessarily have to be updated. While the concept of the working class encompasses all regular wage workers with binding contracts, the proletariat also includes the idle workers and the poor and superfluous. (Today, on the global level of capitalism, much of the proletariat is unemployed.) The proletariat thus includes not only relatively well-paid electronic assembly-line workers, but also unemployed peasants who have been expropriated, and the layers expelled by cybernetic automation, or what is commonly called the "precariat. (Cf. Standing 2015)

In this context, Dyer-Witthorfs refers the concept of cyberiat to the studies of George Caffentzis and Silvia Federici, whose analyses of primitive accumulation in the global South and of women's work in factories and homework show that network capital

today needs both the cyborg and the slave. With Karl-Heinz Roth, Dyer-Witheford proceeds from a "proletarian multiverse," ranging from diverse paid and unpaid labor to slave labor and work in shadow economies that may well be connected to digital networks. Dyer-Whiteford does not understand this processual fragmentation, which also includes categories such as race and gender, in the context of the interaction of given categorizations, but as reciprocal determinations. The intensification of exploitation caused by cybernetic automation is based precisely on the work of women and non-European populations.

With regard to the composition of the proletarian class and the cycles of class struggle (with their reference to cybernetics), Dyer-Witheford refers to the theorists of communization who, in their analyses of global capital relations, identify a heightened antagonism between the reproductive needs of capital and those of the proletariat. Furthermore, he repeatedly mentions Marx's concept of the surplus population reactivated by the English collective "Endnotes".

A further stage in the production of the world market was the continuation of automation, which would be unthinkable without the comprehensive use of information technologies, whereby in this phase new jobs were created on the one hand, and superfluous and unemployed people were expelled from production on a massive scale on the other. This "moving contradiction" manifests itself today in the integration of the global population into the networked supply chains and fluid production systems that keep work available for capital on a global level and make it superfluous with the intensification of automation and algorithmic software. Digital capital has created a planetary working class that works itself out of its jobs by creating comprehensive systems of robots and networks, networked robots and robotized networks for which the human element is a variable surplus (based on algorithms, invisible software operations). (Dyer-Witheford 2015: Section 1) Robots were first introduced into automotive and steel production and mechanical engineering, but sales were also high early in the pharmaceutical, food and electronics industries. In addition to industrial robots, there is now an increase in service robots in certain centres of global production that do not operate fully automatically, but rather assist human users.

#### The cybernetic capital vortex

Dyer-Whiteford is particularly concerned with the recomposition of the global proletariat in its relationship to cybernetics, with the global proletariat trapped in a cybernetic capital vortex. Dyer-Witheford thinks the dynamics of capitalism, let's say capital and capital accumulation, like a vortex, a tornado or whirlwind based on a tripartite process: Production, circulation and financialization. (Ibid: Section 2) Two factors are important for the dynamics of these economic processes: the organic composition of capital, in short the rate between constant and variable capital, and the composition of the working class/proletariat, the latter being the relation between the technical conditions of labor and the forms of political organization that may emerge from them. Today it is easy to understand how capital, in the course of enforcing its technological innovation shocks since the 1970s, has weakened the politically well-organized working class and at the same time opened up new resources of cheap labor at the global level, while greatly increasing the speed and turnaround time of capital cycles.

In presenting the term "capital vortex," Dyer-Witheford refers to a quote from Marx/Engels in the Communist Manifesto, where they speak of global capital accumulation as an uninterrupted anxiety that would dissolve all fixed and frozen relations and melt away in the air anything solid. What Nick Land describes in this context as "Cyclone" is what Dyer-Witheford calls "Vortex". In scientific discourse, vortex refers to the movement of a mass of particles rotating at a certain speed around a common centre. (ibid.) The vortices do not only move within horizontal circles, but often also take vertical dimensions – e.g. upward suction of tornadoes. In nature, the ubiquitous phenomenon of the vortex was often adopted in Marxist literature; one thinks of Benjamin's Storm, which blows from paradise, or of the adoption of certain metaphors from meteorology by the American guerrilla group "Weathermen," but the bourgeois economist Joseph Schumpeter also used metaphors from meteorology when he wrote about large irregular currents in the course of creative destruction. Most recently, David Harvey spoke of the possibility of mapping the movements of capital in the various places on the planet, in terms of urbanization and the unequal geographical design of space on Earth in the context of the time-space compressions of capital (destruction of space by time, or accelerated movement of capital through space). Analogous to meteorology and its satellite images, we would then see a whirling chaos in which high-pressure and low-pressure areas alternate and are supplemented by islands of storms, tornadoes, and hurricanes. In this chaos, however, patterns can also be recognized that point to long-term changes in capital accumulation, but are geographically unequally distributed; one thinks of the swirling high-pressure areas of accelerated capital accumulation since the 1980s in parts of Asia, the west coast of the USA, London, Bavaria, etc., and of the low-pressure areas above the old industrial centers, Detroit, Sheffield, and the Ruhr. (Harvey 2011: 151 f.) In contrast to the constancy of the laws of flow dynamics in meteorology, the accumulation of capital is confronted with expanding variations.

To characterize the dynamics of financial crises, the term "turbulence" appears again and again; one speaks of money capital flows that rotate in the financial markets in vortex-like systems. In the 1990s, it was Benoit Mandelbrot who regarded storms and earthquakes as open systems and, following this, examined the financial markets for their fluctuations – mathematically, it seems to be demonstrable that we are dealing here with similar weather phenomena with fractal scaling, discontinuities and interruptions, with regular movements on micro- and large swings at macro-level, up to destructive cascades, after which the former chairman of the FED Alan Greenspan even named a book: The Age of Turbulence. Whether vortex or turbulence (where the term turbulence in physical fluid mechanics refers to the state of gases and liquids with statistically unordered paths of particles), all these terms are used after the chaos or turbulence theory of physics in knowledge discourses on the exchange system to describe the so-called flow dynamics of financial market transactions. These terms serve to describe the so-called

molecular short-term fluctuations of algorithmic securities trading on the stock exchange, whereby gigantic amounts of data are processed purely by machine, while financial mathematicians and physicists feverishly investigate the statistical affinities of volatility leaps – modulations of interest rates, foreign exchange and security prices – and historical forms of volcanic eruptions, hurricanes or sandstorms by tracing certain data back to the 17th century and feeding them into high-performance mainframes.

### Capital

Capital is a value that expands by itself, money that generates more money, or as David Harvey writes in his book *Deciphering the Riddle of Capital*: “Capital is not a thing, but a process in which money is constantly sent on the search for more money. (Harvey 2014: 45) It is of course also a thing (fixed capital), as Harvey later writes in his book *Seventeen Contradictions and the End of Capitalism*, but only secondarily. According to Dyer-Witthorfs, the vortex of capital, which always requires growth and profit, revolves around the world in three essential areas: production, circulation and financialization. Production is the funnel of the storm, circulation is the moving rotation, and financialization is the crashing turbulence. (Dyer-Witthorfs 2015: Section 2; Kindle Edition) The core of the vortex is surplus production. Circulation includes the worker, whose labor is bought by capital, and the worker as consumer. Once the circulation cycle is complete, capitalist goods in potency as surplus values created in production are updated in the sale. Horizontal and vertical vectors of production and circulation form the fundamental dynamics of the value vortex. However, the moving force field remains always unstable. Strictly profit-oriented production tends to put pressure on wages, while in circulation low wages limit consumption. At the same time, machinic intensification reduces the quantity of living labor in the production process, thus disrupting the basic transfer of energy. Dyer-Witthorfs sees credit- and debt-driven financialization, which transforms production and circulation and leads directly from money to extra money, as a decisive factor in the attempt to regulate these instabilities.

Dyer-Witthorfs presents the machine capital vortex with the well-known Marx formula:  $G - W - A/P - W - G$ , whereby the part  $A/P - W$  concerns the production,  $W - G$  the circulation and  $G - G'$  the financialization. In this process, the vortex of capital transforms work into technological crystallization. Like many Marxists, Dyer-Witthorfs sees the attractor of the capital vortex, around which market prices fluctuate probabilistically, in the socially necessary, abstract working time and the corresponding compensatory movements (production of the general average profit rate). Both the competition between companies and the political pressure of workers on wages mean that companies reduce the cost of labour by replacing human labour with machines. Marx's moving contradiction now is that the capital vortex not only mobilizes labor, but also eliminates it, not in a balanced process, but in a spiral movement that leads to ever stronger processes of automation.

Dyer-Witthorfs's description of the law of the tendential case of the general profit rate follows the texts of Guglielmo Carchedi. (ibid.) We have discussed the Marxist discussion about the law in detail using the texts of Georgios Stamatis and Michael Heinrich in *Capitalization Vol. 1* and also on NON. Dyer-Witthorfs speaks here, in the course of the renewed incorporation of the vortex metaphor, of a self-resolving process that emerges within the circulatory flows of storms. He refers to Manuel DeLanda's portrayal of the dynamics of a tornado, in which rising draughts of air, air carrying water vapour, are confronted at a certain altitude with colder temperatures, whereby the water vapour condenses or freezes to ice in a phase of transition into rain. The heat released increases the speed of the air masses for a certain phase, but the rising air masses are saturated with larger drops of water and ice crystals until their weight reaches a tipping point and begins to fall as hail or rain, taking the energy from the storm and possibly destroying it. Dyer-Witthorfs tries here to illustrate the tendencies and counter-trends that influence the fall of the profit rate within the accumulation of capital – processes that can definitely lead to the calcification of capital, i.e. a too high commitment of fixed capital and finally to the collapse of “a cathedra of mechanical automation”. (ibid.) These processes take place in cyclic patterns, whereby wars and crises repeatedly devalue capital, the prerequisite for a new cycle of technological innovation to take place. Similar to Heinrich, Dyer-Witthorfs sees the future development of the profit rate as uncertain, citing a number of trends that counteract the fall in the profit rate, such as cheap labour and slaves in the colonies (see Jason W. Moores billige 4), the cheapening of machines and raw materials, the intensification of labour and various forms of financialisation or credit. If automation reduces the price of goods, this may also be the case for machines. This would lead to an increase in the technical composition of the capital (more machines in relation to the labour force), but a reduction in the organic composition of the capital. (The organic composition of capital refers to the interdependence of the technical composition and the value composition of capital  $c/v$ , insofar as the latter reflects the former, taking into account respective price/value changes of  $c$  and  $v$ ). The profit rate, in turn, can be defined as a relation of relations, namely the relation between the value-added rate and the organic composition of capital, and its case articulates the dominant technological development in capitalism.) More casually, Dyer-Witthorfs mentions the Marxist debate about the law of the falling profit rate.

The authors of the study, such as Kliman and Roberts, ascribe central importance to the law for the outbreak of the crisis to the law. On the other hand, authors such as Heinrich and Milios place the law in a more complex context, whereby the financialization qua credits, fictitious capital and derivatives can certainly slow down the fall of the profit rate. Finally, Dyer-Witthorfs states that the question of the fall in the profit rate is a problem for capital, which capitalists, managers and state representatives in particular have to deal with. For the proletariat, it is less a question of the organic composition of capital and the fall of the profit rate than of the composition of the class, whose struggles can also have an influence on the fall or rise of the profit rate, which Dyer-Witthorfs then calls the “rate of struggle”.

The composition of the global proletariat

In the capitalist vortex, the human working material is divided into layers that are internally fragmented and furrowed and move in relation to one another. The concept of the proletarian class therefore absolutely requires an analysis of the power relations that relate the class to capital, but also divide it internally. Here, Dyer-Witheford again falls back on DeLanda's account of the dynamics of the tornado, in which he writes that atmospheric layers from which the storms emanate must be understood in terms of capacities, tendencies and emergent characteristics that often interact with each other with random consequences. Class is a force.

In his text, Dyer-Witheford is particularly interested in the relation between proletarian class and cybernetics, in terms of their influence on the cycles of class struggle and the related composition of the global proletarian class. The capitalist class and its representatives are the owners of the great machine systems, of fixed and circulating capital. The proletariat, which has no access to the means of production, must rent out and produce its labor for wages, organized in machine collectives, machine systems from which it in turn is eliminated. Between the capitalists and prolets, as capital accumulation increases, we find intermediate layers – managers, technicians and scientists – who construct, design and observe the machines, and also train those who have to work on the machines. Within the proletariat itself, there are various factions – contractually and welfare-state wage workers, precarious and chronically underemployed, impoverished and unpaid women in the reproductive sphere. Dyer-Witheford is concerned with processes of separation and interaction between these different strata, with the class struggle also determining the fluctuations and frictions at the borders of the respective strata. (Ibid.) The movement of the capital vortex constantly changes the layers of which it itself is composed. Thus, not only capital, but also the human labor force has a composition. In this context, some authors of operaism distinguish between technical and political elements of class composition. While the technical composition remains related to the organization of the class by capital (division of labor, management practices and the standardized use of machines, but also family and communal relations), the political composition affects the capacity of the working class to fight for its own desires, inclinations and interests – individual and collective actions of refusal, resistance and partial appropriation of surplus value.

In the cycles of struggle, both the composition of the capitalist class and the class of the proletariat change. According to the Italian theorist Raniero Panzieri, the increase in the organic composition of capital is not only based on the process of technological progress, but is always to be understood as the result of a shock offensive of capital in order finally to decompose the composition of the proletariat in terms of its political power. Just think of how the resistance of the qualified mass workers was broken by Taylorism and the assembly lines in Fordism, but also led again to a new technical composition of the class with which there was the possibility of stopping the assembly lines; there is a relationship between the cycles of struggle and the circulation of capital; one thinks of interruptions of transport, logistics and infrastructure, of disturbances that, according to the operaists, spread to production to the entire social factory of life. The criticism of operaism in turn points out that the subject position of the workers was initially determined by capital, so that tactics of spontaneous resistance always remained rudimentary. With regard to the critique of operaism, Dyer-Witheford refers to the group *Theory Communiste (TC)*, which discusses the "mistakes" of the proletariat in the context of the reciprocal relationship between capital and the proletariat, a relation that is not only to be understood as antagonistic, but in which the two poles are integrated within a single system. And this integration has intensified in the history of capitalism, not only through the politics of trade unions, social democratic and communist parties, and the politics of the welfare state, but also through the various self-government projects, state planning, and class self-management. Since the neoliberal offensive of capital, characterized by the privatization of public institutions, rapid technological shocks and logistical globalization, any reformist project has become impossible. This statement today is directed above all against negriism and its naïve attitudes toward the revolutionary potential of the multitude, with endless divisions and fragmentation of the proletarian class and its struggles rather than a spontaneously unified multitude in the face of current class struggles. The trick of Dyer-Witheford is now to understand the contradictory tendencies in the struggles as a single process in which the proletariat is part of capital, just as it fights against capital.

#### Cybernetics, logistics and global supply chains

The intensification of the machinic element in the capital vortex is often a result of economic crises and wars; the development of computers and digital networks within the framework of the US national security state (after World War II and during the Cold War) is a result of military research. Later, the computer was sold to commercial companies that used it as a weapon in automation, and even later, as the processing power of computers continued to rise and prices fell, successive generations of computers were brought from the consumer goods industry to the markets, PCs, laptops, smartphones, etc. The computer was also used as a weapon in automation. Dyer-Witheford again investigates the consequences of this cybernetic revolution in the areas of production, circulation and financialisation. In production, cybernetics is an important factor that stands for the intensification of automation (the transformation of work processes in relation to fixed capital), numerically controlled machines, industrial robots and systematized chains of computer-controlled flexible productions, accompanied by new forms of workplace organization and management control, not only in factories but also in offices. In the circulation (the one that takes place out of production), cybernetic automation takes place through the network of networks, the Internet, in the phases of the realization of the commodity qua advertising and marketing, both of which now run through PCs, from the primitive forms of e-advertising qua pop-ups and commercial portals to the social networks in which the free work of users takes place, whose data is sold and evaluated by the consumer industry. Algorithmized data is codified and exploited via the Internet. In the circulation (the one that

leads into production) in which the purchase of machines, raw materials and labor is organized, networks for the production of global supply chains are today absolutely necessary in order to connect the geographically separated but functionally related production sites and business operations with each other. Capital, which has become extremely mobile, constantly analyses local cost differences in terms of production and circulation in order to exploit every possible profit difference. The geographical mapping of the planet by capital tends on the one hand to exploit economies of scale through the aggregation of several companies in one place, thus achieving higher profits, and on the other hand to organise ever deeper decentralisation, the relocation of companies and outsourcing made possible by global logistical chains. Finally, technological innovation, obstacles in space, intensity of economies of scale and differentiations in the process of capital accumulation determine possible developments. (Cf. Harvey 2011: 162) The infrastructures of the telecommunications industries, modularized interfaces, barcodes and Instruments based on RFID technologies have enabled a logistical revolution in recent decades, allowing capital to capture and use labour resources on a global scale. This is an aspect of cybernetics that, instead of replacing labour at the global level, expands labour at its scale, with labour use usually taking place at the lowest possible wages.

The fixed costs of the industrial investment can also be limited by other factors: Machines produce machines that perform their operations at higher speeds, machines that suck in cheap labor, and machines that replace living labor – Ballards Crystal World, a vortex of robots and networks, robotized networks, and networked robots. (ibid.) However, to create this vortex, we need area-wide and comprehensive cybernetic systems and networks. Marx already knew that technological innovation would make individual machines cheaper, but at the same time it would be necessary to develop systems of machines whose overall prices could rise enormously. Industrial computerization actually went in this direction – starting with the use of a few robots in production through full computerization of factories and offices to satellite-networked production, logistics and various point-of-sale platforms. This has led to an enormous increase in the cost of using new technologies for companies. While there has been a regular reduction in the cost of chips, there has also been an increase in the cost of the systems needed to manufacture the chips.

Chip manufacturing companies have become larger and more automated. In 1966 a new factory cost \$14 million, in 1995 \$1.5 trillion and today the price is \$6 trillion. (ibid.: Section 4) The cybernetic revolution divided companies into different sectors. Today, many production processes run largely on a microscopic scale for which human perception is inadequate. Only robots are capable of adequate perception. However, human labour is not enough, as technicians and engineers must be present during production stoppages and disturbances in order to remedy them as quickly as possible. Updating the software alone can generate immense costs that compensate for the cost-saving effects of Moore's law, so that the organic composition of the capital can increase again. To some extent, this can be compensated by tapping new sources of poorly paid labor at the end of electronically coordinated supply chains, outsourcing production to low-wage countries, and activating unpaid digital labor. George Caffetis, in his "Law of the Growing Dispersion of the Organic Composition of Capital", assumes that any increase in composition through the use of new technologies leads to the emergence of industrial areas in which the composition decreases again. (ibid.: Section 2) There is always a transfer of value, for example from the production of iPhones at Foxconn in China to Apple's dream factories in Silicon Valley, where only a few people are employed. In the cybernetic capital vortex, in the highly developed industrialized countries, living labor is replaced by automation, and at the same time new sources of cheap labor are absorbed, especially in Asia and Africa, while the resulting effects on production and consumption are to be compensated by financialization qua debt and speculation.

#### Machines and proletarian class

With regard to the composition of the proletarian class, it can be said that the cybernetic revolution destroyed the factory as the basis of the Fordist mass worker, reduced the labor force through automation in the metropolises (with jobs increasingly being shifted from industrial production to services and technical work), and geographically localized and expanded it more strongly in the former peripheries, which in turn became possible only through the comprehensive containerization of transport and digital logistics. In this context, Dyer-Witheford examines the rise and fall of the industrial mass worker through the Detroit automobile industry, where the mass worker was initially able to celebrate great successes in earning higher wages, social benefits and raising living standards, which eventually became exemplary for the entire working class in the United States. In the period after 1949, the automobile became a symbol of personal freedom and prosperity in the U.S.; it was the commodity in a nexus that linked property, highway networks, suburban home ownership, and the consumption of oil. In the 1950s, General Motors was the largest industrial manufacturing company in the world, generating 3% of U.S. GDP alone.

Marxist Ramin Ramtin defines the machine from three essential elements: Power transmission, transformation of motion and control of direction

With regard to capitalization, Dyer-Witheford mentions Randy Martin's studies on the financialization of everyday life. (Dyer-Witheford 2015: Section 2) We have already analysed the comprehensive significance of information and telecommunications technologies for the financial industry elsewhere. We have also discussed the relationship between digital technologies and financialisation elsewhere. It should only be said here that one of the main influences for the high level of automation came from the derivatives markets themselves. These were closely linked to logistics from the outset, for example in that various forms of futures were developed to hedge the uncertainties of foreign investments, especially currency fluctuations. The mathematical models based on risk production are now largely computerised in high-frequency trading. In this context, Dyer-Witheford refers

to Brian/Rafferty as meta-goods or derivatives that remain the strongest product of circulation (and less of labour), i.e. never leave the cycle from money to extra money.

The global value of cybernetic industries (communication services, computers and the environment, communication goods, semiconductors, etc.) has risen from 800.349 million dollars in 1980 to 28 trillion dollars in 2010. (ibid.: section 2) The distribution of the effects of cybernetics within the capital vortex – automation in production, networks in circulation, and algorithms in finance – is of course only half the truth, insofar as production itself is a circulation process that requires networks; circulation contains production processes of companies in marketing and logistics; and finally, companies are decentrally regulated by financial capital, whose modes of operation are based on algorithmic production, through the financial markets. (The universal communicator of all these processes today is the smartphone. Its sales are boosted by feedback loops in which successful circulation produces effects that only accelerate circulation: A popular smartphone attracts app developers who create app libraries that motivate consumers to buy even more of that model. The power clearly lies with platform providers like Apple, who also control the distribution channels for apps. Apple is collecting a kind of technological pension. In this context, the “app economy” is worth mentioning; the number of workers working in software applications in the USA in 2012 is estimated at 500,000. App production is often seen as another form of automation, and this cybernetic design process, which often involves networked crowdsourcing (Apple), is also affected by the reduction in labour costs. ibid.: Section 9)

The cybernetic transformation of capital accumulation entails complex effects on the organic composition of capital. The cybernetic restructuring of automation and the development of electronic networks in recent decades has been much faster than previous technological revolutions. The analysis of the digital speed of computers is based on the Moore'sche law, according to which the performance of computers doubles every 18 months at a given price. The success of the law is based, among other things, on the semiconductor industry, which succeeded in combining cybernetic technologies (microscopic operations with high quantities of toxic chemicals) in global centers with cheap labor in the peripheries, which were also released from production processes with more intensive automation. In addition, a law formulated by John Metcalfe is being applied, stating that a network grows with the number of squares of nodes, a principle that requires investment in wired and wireless connections. (ibid.: Section 2)

With the reduction of the cost of the elementary element of cybernetics, the microchip, a reduction in the cost of machinery has been set in motion, which, in the event of an increase in the technical composition of capital, does not necessarily lead to a corresponding increase in the organic composition of capital, but rather can it remain constant or even fall, with the result that the law of the falling rate of profit is invalidated.

nd speed. (ibid.: section 3) In the early industrial machines, these three elements were still directly related to each other and to a single task. In addition, the machines were quite inflexible in practice. The machines functioned as parts of the relative value-added production and the workers had to obey their rhythm at all costs. Their rigidity, however, also limited the reign of the dead over living labor. In the late 19th century, electric motors separated the power sources of machines from their movement. One machine could have several motors, or several machines could be driven by one motor. Although this machine development disqualified large parts of the human labor force, it required the development of a skilled labor force cadre to monitor the machine systems. This kind of mechanical automation was still based on the combination of man and machine, and from a political point of view, the mass worker could also stop the machines.

The cybernetic feedback loop revolutionized the moment of machine control in particular. If a machine has sensors to measure and correct its own performance and its own data, i.e. to recursively adapt the input to the output, it largely replaces the human function of control, which was still essential in industrial systems. The feedback loops give the cybernetic machine qualities that were previously attributed to human work: Flexibility, adaptability, primitive learning and self-control. Automation separates the movement of the machine from the human body. And networks do the same in terms of communication by generating signals that circulate independently of human language and writing and become subject to technological modulation and reconfiguration (telephone). Research concentrated on networks refers not only to self-reproducing robots (von Neumann), but also to machine-humans hybridity, which culminates in the concept of Haraway's cyborg.

#### The Toyota system and its effects

Dyer-Witthorff presents all these insights in order to explain the difference between the Fordist enterprise that generated the mass worker and the Toyota system. (Also in the US, the industrial sector was computerized at that time, particularly to reduce labor costs through the automation of steel factories, the invention of CAD/CAM design, and digital logistics management that enabled outsourcing in the textile and electronics industries.)

Dyer-Witthorff summarizes the essential elements of toyotism as follows (ibid.: Section 2):

- 1) The reduction of manpower through the use of cybernetic machines that know when to stop their operations. The prototype of this development was a self-activating weaving machine used in the textile industry, which was based on the feedback loop and incorporated human working capacities into its rhythm. The workers could now operate several machines at the same time.
- 2) The redefinition of the worker, who now not only had to obey, but was regarded as an active participant in production, for example through the possibility of changing the speeds of the machines (Kaizen system), which, however, did not serve to slow

down the machines in principle, but to create more effective adaptations of the worker to the machine. Comprehensive teamwork was set up, with tasks no longer tied to fixed times.

3) The reduction of the inventory by outsourcing suppliers, for which the development of electronic networks was absolutely necessary, insofar as these made it possible to deliver the necessary parts for the manufacture of a product on demand (just-in-time). The fixed and circulating capital tied to the factory was thus significantly reduced.

4) Production was adapted more precisely to the requirements of demand and consumption by increasing the number of models and accessories, so that production proved to be much more heterogeneous and adaptive than in Fordism. The adaptation to demand required the exact, frequency-calculated use of tools and machines, the flexible adaptation of production and the establishment of flexible working conditions. Taiichi Ohno, vice president of Toyota in office in the 1970s, summarized this development in the term "autonomization", servomechanical automation. The worker was understood as a part of the feedback loop of the machine, as a sensory element in a purposeful process that served to understand the biological and mechanical components of the machine. While robots were most intensively used in the automotive industry from the 1980s onwards, global capitalist production at the same time required the construction of complex logistical infrastructures that depended entirely on cybernetic systems. While public attention to the Internet grew only slowly, the most intensive applications of cybernetic systems outside the military sphere were clearly evident in companies and on the stock market. Automotive companies were at the forefront of this development in the 1980s, when General Motors began planning a new car series (Saturn) – embedded in a stream of resources including raw materials and outsourced components, coordinated by satellite-based computers. Even though the model was not successful, it formed the basis for the first comprehensive supply management system that connected suppliers, factories and customers across the board. (ibid.: Section 3)

The just-in-time logic of toyotism has been significantly intensified by the integration of fluctuating information flows (related to inventory capacities and markets) into databases and networks. Often the suppliers settled near the main production sites, but this was not always necessary due to the progressive development of logistics and containerization. However, it required a global system of direct investment, trade agreements and the development of cybernetic networks, especially to facilitate access to areas with high resources of cheap labour, such as Mexico, Southeast Asia, China and India. In 2005, the automotive industry worldwide produced about 87 million cars, buses and trucks, a clear indication that the capital vortex is by no means weightless, immaterial or clean; on the contrary, it increases the production of products made of metal and plastic, driven by fossil raw materials circulating around the planet. (ibid.)

Today, even the software production of capital is permeated by the methods of Taylorism, Fordism and Toyotism at the same time. In a classical disqualification process, structured programming techniques (Object Oriented Programming) broke the writing of software into modules or into relatively simple step-by-step tasks. Executives transfer modules and tasks to programmers who work on them more or less simultaneously, while they are observed by team colleagues in regular control excursions that compare, check and uncover irregularities. This is a programming proletariat that does not hack, but often tries to mask its proletarian status by signs of hacking. The work of the programming proletariat, on the other hand, cannot be imagined without a series of other types of work. In the industrial processes of computer production one finds the jobs of semiconductor production in clean white spaces, the jobs of circuit boards, printers and cables in less clean spaces, sometimes at home, and the jobs of poorly paid service workers. In Silicon Valley, there were about 65,000 electronic assembly workers in 2000, 40,000 non-assembly workers, and 200,000 service providers, the latter often women and migrants. (ibid: section 4) Flexible working conditions are the order of the day, but the real killer for workers worldwide is the toxic waste that comes from manufacturing semiconductors. Accelerated computer production multiplies the use of toxic chemicals, reduces workers' time to regenerate, and at the same time reduces companies' attempts to stop toxic production. Global production also makes it impossible to imagine the Silicon Valley dream factory without production sites in Bangalore, Delhi, Puna and Hyderabad, where, for example, service workers in the computer industry earn \$30 a month, work 12 hours a day or more without any job security, and live in tents or slums near the Cyber towers. The triadic pattern of lucrative high-tech capital, professional informational work and exhaustive, low-paid work is replicating itself today on a global scale.

#### Global supply chains

In this context, Dyer-Witheford examines the global supply chains with which today's large companies organize their goods production worldwide, i.e. arrange each element geographically in such a way that labor costs are optimized, access to raw materials is effectively regulated, and optimal proximity to markets is ensured in order to expand the logistic chains into integrated, continuous sequences. From the 1980s onwards, these supply chains were to a large extent responsible for the technical composition of the global proletariat, especially in the second and third world. From a technological point of view, these chains go back to cybernetics. In the course of increasing computer power, higher transmission capacity and more powerful software, telecommunications became cheaper and cheaper, so that it made sense to separate the factories geographically and reassemble them on a global level. It was relatively easy for the large industrial nations to combine high-tech technologies in their own countries with cheap wage labor in the countries of the peripheries. Transport routes from globally dispersed suppliers to the main company were effectively managed through modular production processes and standardized interfaces between suppliers, customers and headquarters. Data traffic has been improved through standards such as Electronic Data Exchange (EDI) formats. These logistical supply chains not only changed the composition of the global proletariat, they also created the

Internet of Things. A crucial moment of this development was the introduction of the barcode by IBM in the 1970s; the first step of a logistical revolution in which transport and communication were later accelerated and optimized through detailed cybernetic tracking, inventory control and screen-based systems. As logistics chains grew in length and complexity, they generated their own sector of capital production (Microsoft, Oracle, SAP, Epicor, etc.). (ibid.) The aim was to tap into the cheapest resources of labour, produce goods at the lowest cost and move them at the maximum speed from production to sale, develop new transport routes and resolve current and future organisational problems as quickly as possible.

Walmart is the classic example of a gigantic supply chain that combines logistics with just-in-time production. In 2005, the data centers connected to Walmart tracked approximately 680 million different products per week; barcode scanners and precise computer systems identified more than 20 million customer transactions per day and stored this information. (ibid.: Section 5) The satellite communication linked the respective business centers directly to the central computer system and from there back to the suppliers, in order to guarantee the automatic ordering process as smoothly as possible. Finally, the RFID system was introduced. (Dyer-Witthorfs speaks here of a second economy that has emerged alongside the physical economy, which develops silently, invisibly, networked and almost autonomously, even simultaneously and in constant reconfigurations.) The most radical changes in logistics, however, took place at the end of the globalized chains, where the deindustrialization of the North as a reason and effect on rural depopulation in the South traff, to set in motion a new wave of primitive accumulation. In Asia, Latin America, and Africa, migrants flocked masses to metropolises and their informational economies, or to the North and its service sectors, or to special export zones in Mexico, the Philippines, Malaysia, Thailand, and especially China. China also became the epicenter of workers unrest. At the same time, North American workers migrated heavily into the circulation sphere, where Walmart replaced the automobile group General Motors as the most employment-intensive company in the USA. Here, the combination of a low-paid workforce (including in the supplier industry), low prices and high profits temporarily unleashed a strong pull for the dynamism of the entire US industry.

#### The Internet

After Dyer-Witthorfs has extensively examined the class composition of the global proletariat in the current computer industry, he is concerned with new de- and recompositions of this class in and around the Internet, focusing on the circulatory flows of the cybernetic vortex in the Internet. The added value here is produced/realized not only through the extraction of often unpaid labor, but also through acceleration and technological innovation, among other things by increasing the turnaround times of capital. In the 21st century, the Internet became a huge sales machine. If logistic supply chains are the dirty little secret of the digital revolution, today the Internet is the pretty face of an exploding communication for consumer purposes, qua streaming advertising, consumer tracking and increasing the sale of goods. The gold rush on the Internet involved many agents from the beginning: The computer sector, which produced software and hardware, telecommunications companies and cable producers, retail and B-2-B companies, media companies and the entire entertainment industry. Venture capital invested enormous amounts of money early in the high-risk sectors. The share prices of dotcom companies were not based on performance, but on expectations.

With Christian Fuchs, Dyer-Witthorfs assumes that Web 2.0 capital is characterized by platforms that extract the added value from users' free work, either as the production of passive raw material processed by search engine crawlers, or as the active creation of users in social media. (ibid.: section 5) At the same time, the corporations use open source software to collect, connect and evaluate user data, i.e. to create patterns and clusters to massively accumulate data capital. This free work, however, is only one form of a multitude of works in the shadow economy that function in addition to wage labour. It is the cheap labour force, of which Jason w. Moore, who have always been constitutive for the history of capitalization and proletarianization.

For the class composition of the global proletariat, free work in Web 2.0 has the following consequences: a) limited expansion of techno-scientific workers in Web 2.0, b) mobilization of prosumer content by extending an unpaid digital working day, c) subversions to old-school media workers, d) development of a digital microbusiness in niche markets, e) intensification of the circulation of goods, and f) autocommodification of one's own person in promotion and reputation management (qua optimization of profile). (ibid.) Every Facebook posting creates the extraction of added value, albeit parasitically, using the user's fear of social exclusion to promote the circulation of capital. There is definitely a connection between the Facebook users and the cheap workers at Foxconn, insofar as the former are dependent on the cheap goods (computers) from China, and thus the computer produced in China is a prerequisite for the Facebook activity of the user, who in turn delivers free work on Facebook and incorporates a specific subjectivation form of capital.

#### The global proletariat and the zones

Dyer-Witthorfs really examines in depth the composition of the global proletariat (in its relationship to cybernetics), which he with Karl-Heinz Roth calls a "multi-layered multiverse" (ibid.: Section 7) composed of those classes that have to sell, disenfranchise, or rent their labor to capital in order to secure their reproduction, and the surplus population, which itself remains denied the sale of labor. The portrait of cybernetic proletarianization encompasses the world-historical exodus of the agrarian populations, with automation and biotechnologies continuing to strongly disintegrate peasant cultures; surplus populations in the informal sector; and massive subsistence farming, with logistics facilitating the transfer of industrial labor from the northwest of the world to Asia; there is the development of a diffuse service sector due to wage labour in reproduction and circulation; there is the mobilization

of women for paid and unpaid work and the escalation of unemployment, underemployment and unpaid or insecure work. What set all these movements in motion was the differentiation in wage development in the wake of the new global "regulation" of capital, which included the separation between the old capitalist centers and the peripheries – thus creating new opportunities to rent cheap labor and buy cheap land and advance the development of previously unprotected ecospheres. The worldwide outsourcing and offshoring of large companies is setting a dynamic in motion in which even some logistical destinations of the former peripheries finally reached a critical mass of industrialization, so that they could compete with the old centers of capital accumulation in Europe and the USA, think of some cities from the BRICS states.

Theory Communiste (TC) speaks today of three zones on the capitalist world market: 1) The hyperzones of capital with high functional performances in the area of the labor markets and the places of production (finance, technology and research). 2) Secondary zones with intermediate industries and technologies (logistics and communication). 3) Crisis zones of informational industries with low-paid work or zones where no work is done at all. (ibid.) While the production of capital is unified throughout the zones, this is by no means true of the reproduction of labor. In the first zone, highly paid wage labor meets with private risk insurance and those jobs in which certain aspects of Fordism are preserved while other workers struggle with precarious conditions. In the second zone, precarious, low-paid labor is the norm, mixed with islands of contract-paid labor, migration, and the lack of coverage for social risks. In the third zone, the survival of the proletariat depends on humanitarian aid, illegal trade and Mafia structures, on agriculture, but also on small communities. This must be understood as a volatile and porous process, permeated by the constant migration of the proletariat and the restructuring of capital. For example, when wages rose in China's industrial enterprises, Chinese capital migrated to Southeast Asia and Africa for the first time. In these zonal arrangements, the proletarian class is fragmented and fractalized, the former insofar as the conditions of social reproduction can vary greatly from one zone to the next, fractal insofar as the fundamental relations between capital, intermediate strata and proletariat manifest themselves in self-similar patterns in all zones, albeit in different scales and mixtures.

From 1980 to 2010, the body of planetary labor has increased from 1.2 billion to 3 billion people. This was by no means solely a consequence of global population growth, but a consequence of the deepening of global capital accumulation and markets. Without the use of cybernetic technologies, the systematic global organization of labour, its flexibility and granularity, its production and circulation would not have been possible. In the future, however, capital accumulation will revolve less around the reproduction of the labor force than around the reproduction of cybernetic systems. The combination of globalization and cybernetics has revealed two tendencies in the dynamics of the capital vortex: On the one hand, the capture of the global population through supply chains and mobile production, which keeps labor available to capital at a planetary level, and on the other, the drive towards automation, software robots and networks, which keep labor redundant and create a surplus population useless to capital. This "moving contradiction" creates jobs, however it destroys them – by no means in a balanced process, but in a spiral movement that leads to an ever more intense mechanization of capital. The high volume of labor sucked into the cybernetic capital vortex simultaneously creates directly or indirectly the labor-saving systems – industrial robots, automatic transport machines, computer assembly, and algorithmic trading. The workers who extract rare earths, lay cables, construct mobile phone masts and are responsible for the technical operation of the machines produce a world of automatic semiconductor factories, robotized assembly lines, data centers and goods supplied by drones, and finally algorithmized finance. A period of high absorption of human labor by capital is followed by a period of accelerated labor output, with which the new levels of automation in production and circulation – combined with cybernetic financialization – increasingly separate capital from the proletariat. In principle, capital can do without the production of consumer goods; enterprises can produce profit by producing means of production for other enterprises. The precarious labor force as a mere remainder would then be nothing more than a component of fixed capital. However, this is not without crises. (With regard to the foresight of future crises in the Capital Vortex, Dyer-Wittheds concentrates on the areas of employment, opposition, ecology and entity. All trends in the global economy point to a growing inequality of income and wealth as well as a rising surplus population. Meteorological supercomputers and satellite stations are now recording rising CO2 emissions into the atmosphere. The problem of antagonism is related to the rising number of wars, while the problem of the entity is to leave the management of companies to semi-autonomous automated systems. ibid.: Section 10)

Dyer-Wittheds summarises what is today called the global labour market in the following trends (ibid.: Section 7):

1) The end of the global rural population through the development of urban bias and the introduction of monocultures, through the use of automatic harvesting machines and genetically modified seeds from the agribusiness, as well as through partly violent land seizures for industrial production. In 1980, agricultural production was still responsible for 50% of the world's work, in 2010 it was only 35%.

2) Migration. Today there are about 200 000 million migrants worldwide, some are seasonal workers, others nomadize permanently. Nevertheless, these movements are entirely aligned with the flows of capital; the borders of the countries are not open, but rather the migrants are scanned there with the latest technologies; the workers are regulated according to various differentiations (paid/unpaid, qualified/non-qualified, permanent/temporary).

3) Labour nomads. Not all participants in the proletariat, which today numbers around 3 billion, are paid for their work or are poorly paid. About half of the proletariat is engaged in activities that, if at all, only secure subsistence, and this ranges from rural work to seemingly independent work. Regional differences must be taken into account here. Even in the metropolises of capital,

self-employment often implies nothing more than fragile web-based activities in micro-enterprises or nominally independent and contract-based work that remains fully integrated into global supply chains or franchises; these are activities that are well described by self-exploitation and/or forms of mega-proletarianization. In the global South, this often means street labour, day labour, begging and cheap advertising.

4) The existence of a neo-industrial proletariat. Contrary to the incantations of many theorists of the information society, industrial labor on a global scale has not declined significantly. On the contrary, industrial output has tripled in the last 4 decades, from \$2.58 trillion to \$8.93 trillion in a period when the world population has not even doubled. This is far from a weightless, airy or immaterial economy, notes Dyer-Witthorff.

(The economic significance of these figures, however, needs to be examined in more detail. Lohoff/Trenkle refer in this context to the material parameter of labour productivity. (Lohoff/Trenkle 2012) They argue that for the relevant expenditure of living labor, which materializes in the total value mass at a certain point in time, not absolute hours worked, but socially average, abstract working time is decisive. If five jobs in China could be replaced by a single job in the USA, then in the global context only this one job with its relevant productivity would be included in the socially valid, global value mass. In fact, empirical studies would then have to examine the differences in productivity in certain industries in the USA and China (which Lohoff/Trenkle actually also locate in the ratio 5-1). However, when it comes to the problem raised by Lohoff/Trenkle of the melting of the living mass of value in the age of micro-electronics, it is precisely not only material but also price categories that need to be examined – the organic composition of capital, profit rates, the relationship between interest rate and profit rate. Thus, the lower labour productivity in companies in China compared to the USA can be compensated to a certain extent by lower wages (rising value-added rates), and this is to be set in relation to average profit rates and productivity differences on a national and international scale, whereby ultimately price and no material indicators count.)

Indeed, while much of industrial labour has been outsourced from the US and Europe, significant parts of industrial labour have survived in the former peripheries, but at much lower wages, often without unions and in largely deregulated forms. This work, however, is essential for the infrastructures of capital. Just think of the countless cable installations and the construction of huge data centres that send data into the clouds.

6) The multiplication of work and the increase in services, the latter an amorphous category that includes activities as diverse as highly complicated accounting, consulting, doormen and the work of security forces and work in fast-food chains. Many works (advertising, marketing, entertainment, retail and communication) take place in the circulation sphere, i.e. in finance, sex work and healthcare. The feminisation of work on the inclusion of more and more women in paid employment, with differences in length and pay persisting to the detriment of women worldwide.

7) The existence of new education factories, which today accept aspirants from all classes, who are constantly promised higher mobility towards better jobs.

To sum it up: Although the so-called cybernetic capital has increased the pool of workers from which it can draw on on a global scale, it has at the same time created an army of labour nomads for whom even the Marxist term of the reserve army does not apply, insofar as larger parts of these nomads can never again be integrated into capital-oriented production processes. In the words of Mike Davis, they form the "Surplus Humanity. In 2011, as the class struggles flared up again worldwide, the full extent of the new class composition of the proletariat became apparent: the new strata of the Surplus population, the youth re-proletarianized in the education factories as graduate students without a job, the neo-industrial proletariat in factories like Foxconn, and the myriads of precarious, low-paid workers in the squares from Cairo to New York.

Think of the problem of the middle class working in particular in the areas of machine design and the training of workers tied to the new machines and occupying a leading place in the wage hierarchy. Cybernetics has both recreated and destroyed such strata. It seems inappropriate to divide global employment into three sectors – agriculture, industry and services – and possibly enlarge it to include the information sector, inasmuch as it is hard to imagine a job today that is not in any way linked to digitisation. There is an increase in the number of workers strongly linked to cybernetic systems, programmers, software engineers, network experts, web designers, system administrators in all possible sectors (finance, entertainment, marketing and administration) and workers in the new creative industries. The growth of digitally based work is often associated with the middle class and its well-paid wages and high status, but here too this narrative can be challenged by globalization, think of the "rise" of relatively low-paid programmers in India. A large number of works related to networks are standardized, precarious, disorderly and poorly paid. Nevertheless, the growth of cybernetic capital has created a new middle class that is mainly taking over supervisory tasks and technological responsibilities for capital, think of the team leaders, project coordinators and consultants who make up the management apparatus of capital that has been reconstructed at a molecular level in the course of globalization.

Financial capital and Chimerica

Dyer-Witthorff addresses the problem that the reduction or stagnation of wage costs, which has been made possible by automation and outsourcing, among other things, naturally raises the question of who should buy the products that flow out of the global supply chains, a problem that has been increasingly answered in the USA since the 1980s with the granting of

consumer loans. Of course, one can increase demand by increasing the number of workers in the face of falling or stagnating real wages, as has been the case in China, or by increasing luxury consumption and building up strata with considerable purchasing power, as has happened in the USA, and by increasing the number of actors responsible for the realisation of goods in advance (brokers, trade capital, immovables, etc.), and also by weakening direct producers in comparison with large trade capitalists such as Aldi, Apple or Wal-Mart. However, this does not solve either the realization problem or the problem of over-accumulation. The latter can be postponed by excessive prices and fees, higher taxes and a radical austerity policy, but this does not eliminate overproduction and the lack of profitable investment opportunities and thus the overaccumulation of capital. In the context of the over-accumulation of capital, the rising costs of technological investments in complex cybernetic systems and infrastructures are a factor that has probably partly compensated for the tendencies based on cybernetics that counteract the fall in the profit rate. And the real estate sector shows what can happen when banks lend money to the construction sector and consumers are granted mortgages to buy terraced houses built by construction companies. In this context, financial capital is a very important juggler to overcome the crises or to compensate (and not only their perpetrators). Financial capital, which today is equipped with the best integrated cybernetic systems, operates constantly in a field of uncertainty that also causes cyclical turbulence, with the life benefits newly gained by parts of the proletariat evaporating in a matter of seconds.

Using what Dyer-Witheford calls "Chimerica," he analyzes the movements of rural migrants to the urban terminals of low-wage digital device production (China), which consumers in the U.S. are using as a basis for popular use of the Internet, which is increasingly being transformed into a platform for selling goods. The more it became impossible to survive in China's rural areas, the more migrants flocked to the cities and became cheap wage slaves; the stronger consumer credit growth in the US, the stronger economic growth there. These two trends were complementary. While the U.S. was dealing with non-reproduction as excessive credit, the ordinary Chinese were saving to secure hospital visits, housing or their precarious existence in general. If China can be understood as the new workshop of global capital, the USA as the global shopping mall. Part of the rising consumer spending in the USA consisted of the luxury consumption of the capitalists and the new software engineers in Silicon Valley, but the North American proletariat was also able to increase its consumer spending, especially since women were integrated into production at mostly low wages and consumer lending rose sharply so that consumers could buy cheap goods from China in particular.

The thesis of many Marxists, adopted by Dyer-Witheford, that finance in its various forms, from loans to fictitious capital to derivatives, has in part only postponed the problems of the lack of effective demand and low investment, needs its own discussion. Here are just a few remarks.

Factors such as profitability, size, globalisation, mobility, speed, homogenisation and degree of interconnectedness are decisive in determining the hegemony or determination of financial capital more precisely. In addition, there are specific ways in which the capital economy functions, such as decentralised supervision on the markets, which is extremely important for the circulation of money capital, and useful ways in which money capital seeking profitable investments can be distributed. In his book *The Puzzle of Capital Deciphering*, David Harvey points to the effective distribution of excess money capital (while reducing transaction costs) by financial capital in the 1980s, both in the US and internationally, which succeeded in directing capital flows into regions and areas where comparatively high profit rates were to be expected. (Harvey 2014: 39) Of course, these factors also include the highest possible returns, the state safeguarding of bank profits in the event of crises (bank rescue), the strong action potential of financial capital in the context of national and international competition, which Bichler/Nitzan defined in essence as the power of companies to beat other companies (Bichler/Nitzan 2009), the strength of capital power, the existence of largely uncontrolled shadow bank systems and the high network intensity of financial capital. In the financial industry there is still the dominance of shareholder value, above-average returns on capital, bonuses and extremely high salaries for management, as well as the socialisation of losses and the increasing integration of wage earners into the financial markets. While the centralisation of private money capital continued to increase after the financial crisis of 2008, the shadow banking system remained untouched. The share of financial sector profits in total corporate profits in the US rose from 15% in 1970 to around 40% in 2005.1 (cf. Bischoff 2014: 54/Harvey 2014: 57) The rhizomatically networked areas of financial capital, whose conglomerates consist of major banks, investment banks, hedge funds, rating agencies and private speculators, are today permanently opening up strategic fields for global intervention, in part independently of the location of the financial capital intervention agency. And even multinational companies (of all sectors) that maintain large financial departments are to be understood as forms of financial capital, taking into account the divergence between their book and stock market values.

Lohoff/Trenkle speak in their book *The great devaluation* from a structural shift in the dynamics of capital accumulation since the 1980s to fictitious capital or from an "accumulation of capital without value utilization" which, however, at some point also reaches its limits. (Lohoff/Trenkle 2012: 256 f.) The anticipation of future value was initiated by the sale of fictitious capital in the form of property titles (shares, bonds, derivatives, etc.) representing a certain sum of money and the claim to multiplication. (Ibid.:124 f.) With this kind of financialization a further mobilization of the production of industrial goods took place. The use of fictitious (bonds, shares) and speculative capital financed investments in the industrial sector and infrastructure measures with a view to future exploitation. David Harvey repeatedly points out that much of the real estate investment is related to the production of fictitious capital (global real estate speculation). (Harvey 2015: 32ff.) Progressive urbanization and its immediate real estate boom depend on the widespread use of new financial instruments that provide huge amounts of credit. In addition, prior to the 2008 financial crises in the US, local mortgages were pooled and securitized to sell to investors on a global scale (CDOs). It has also

required the development of new financial firms active in secondary markets to spread, diversify and regulate the risks associated with the real estate boom. In addition, a significant part of public and private consumption today takes the form of borrowing, which is itself part of the production of fictitious capital.

For Lohoff/Trenkle, from the 1980s at the latest the financial capital is the engine for the expansion of global goods production, which has been taking place since the 1960s at a high level of productivity and progressive process automation. The authors speak of "induced value production" (Lohoff/ Trenkle 2012: 147 f.) or of "inverse capital", because value production is not based on the extraction of added value through the use of labor, but is driven by the growing accumulation of fictitious capital; indeed, today the entire worldwide production of value is induced by fictitious capital. For without the fictitious capital, the functioning capital (the capital invested in the "real economy") would have had to enter into a growing cycle of mass devaluation.

Lohoff/Trenkle have also attempted to empirically substantiate their theses. First they point to the known figures. In 2010, the Global Wealth Report put financial assets (excluding derivatives) at 231 trillion dollars, four times the current global GDP. Between 1998 and 2008, the total volume of derivatives grew from 72 to 673 trillion dollars – twelve times the global GDP. Lohoff/Trenkle find an important indicator pointing to the hegemony of financial capital in the economic relations between the USA and China, which are commonly referred to as "Chimerica". The steadily growing trade and current account deficit in the USA since the 1980s (higher imports of goods and services than exports), which was financed by the inflow of capital from abroad, corresponds to a surplus in the capital account (increase in capital imports). The US has increasingly imported goods, especially from China, while its financial markets have increasingly sold securities and derivatives to foreign investors (fictitious/speculative capital). Industrial products from China, but of course also from other export-oriented countries (such as Germany), were sold to the USA, while all kinds of securities were bought in the USA at the same time. Chinese private investors and Chinese sovereign wealth funds also invested their profits in the US capital markets, especially until the 2008 financial crisis, i.e. they bought "produced" securities and derivatives in the US, especially since the end of the 1990s, at a time when China once again made a big leap forward in its economic growth rates. China has also pushed ahead with financialisation in its own markets; total debt (government, financial, industrial and private sectors) has risen from 153 percent of GDP in 2008 to 282 percent today, with capital flowing primarily into the construction industry and infrastructure expansion.(ibid.)

A second important indicator for the hegemonic influence of financial capital on the "real economy" is Lohoff/Trenkle in the increasing allocation of consumer funds in the US since the 1980s. The increasing domestic consumption of consumer goods and real estate was financed by consumer loans and mortgages. This is important because private consumption plus spending on private real estate accounts for around 75 percent of GDP in the USA and is thus the most important factor for the economic development of the economy. For Lohoff/Trenkle, credit-financed consumption also points to induced value production, because the purchasing power qua money does not come from past goods production that was realised on the markets, but rather represents an anticipation of future value. In the USA, this applies not only to predominantly imported consumer goods, but also to the domestic construction sector and a whole range of services.

#### Perspectives of the struggles

Autonomous worker theory has linked the circulation and realization of capital to the circulation of the struggles of the global proletariat. Dyer-Witheford speaks here of cascades of struggles that are less smooth than circulations, more chaotic and contradictory. These cascades do not necessarily connect parts of a working class, as was the case, for example, during the time of the mass laborer, but run through new proletarianizations that remain fragmented, segmented and fractalized. Dyer-Witheford mentions three forms of struggle: Riots of the Excluded, mass occupations of public places, and workplace conflicts, in which these struggles may overlap or combine, but may also separate again. This is what makes up a cascade of struggles. Dyer-Witheford analyzes these cascades very concretely on the basis of the class struggles at Foxconn in China, the Occupy movement, and the occupations of squares in Cairo or Istanbul, whereby we are dealing here with inverted cascades, perhaps fountains that do not flow from above like the cascade, but ascend as struggles, but at the same time remain further integrated into unequal dynamics that include segmented subjectivities, limited horizons, and fractional capacities of the class, so that the common politically articulated horizon was hardly present in the struggles of 2011 either. (Dyer-Witheford 2015: Section 10)

Although Dyer-Witheford admits that these struggles would not have been possible without the use of cybernetic tools and techniques, in particular the Internet, he also argues that cybernetics has probably been the most friendly technology yet for capital in its internal history, be it the destruction of space by time, be it ubiquitous surveillance or be it the creation of the global proletariat. Although the proletarian movement must use these tools (spot-covering, but not binding; viral, but monitoring; fast, but fleeting) to relativize them at the same time, that is, one must be against what one uses. And this leads to the question of whether the proletariat can also be against capital. Yes, says Dyer-Witheford, but only if it is against itself, in so far as it is today constantly further segmented by the operations of logistics, the Internet markets and the algorithms of financial capital and thus included in the system.

Finally, Dyer-Witheford addresses the problem of proletarian organization and the need to build a "human front" that permeates all proletarianized and re proletarianized populations, including the precarious middle classes. He mentions two moments with regard to the term "front": from a meteorological point of view, the current in the vortex, which has the power to make it collapse; with regard to the moment of militancy, Dyer-Witheford refers to some remarks by Ernst Bloch, in which he speaks of the front as a line (into the future) marked by militant optimism that should be turned against the banal belief in automatic progress.

Dyer-Witheford sums up the counter-movement against fate and pure negation (war, death statics of capital, fear and barbarism) with the following indicators or orientations:

- 1) Capital today, more than ever, is concerned with the reproduction of its fixed share compared to its variable share. On the other hand, a social body of the communis is to be developed on the planet.
- 2) In order to overcome the blessing of the proletarian classes, their competition with each other, it is necessary to have an organization that overlaps this segmentation, that creates alliances between the working, the unemployed and the precarious classes by taking over certain responsibilities of social reproduction without wanting to renounce the state social network, and at the same time creates new forms of self-administration. The boundaries between riots, wage battles, squatting and hacker activities must be overcome by a new form of class organization that coordinates them.
- 3) Networks. In this context, Dyer-Witheford mentions multiple multiplying movements that learn from each other in struggle, develop new objects and coordinate their operations towards a common goal that can be gradual. For the reasons discussed above, these processes can never be based solely on cyber-activities, so they need to be complemented by slower, local and plan-oriented processes.
- 4) Planning for transitions to communism, where the organizations in the transitions must be mobile, mobile and multiplied and constantly in discussion with the social movements. Dyer-Witheford refers to Karl Heinz Roth's suggestion of combining trade union forms of organization and social movements for short-term goals, an anti-cyclical Keynesianism driven beyond its own borders, workers' control in newly built enterprises, progressive taxation of capital, and massive redistribution of wealth. In addition, the radical reduction of working hours, radical democratisation and local and regional socialisation of companies and institutions must be considered.

Another chapter would be to write about Dyer-Witheford's powerful descriptions of the social struggles of the last twenty years, to which neither the anarchists nor the accelerationists have made significant contributions.

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